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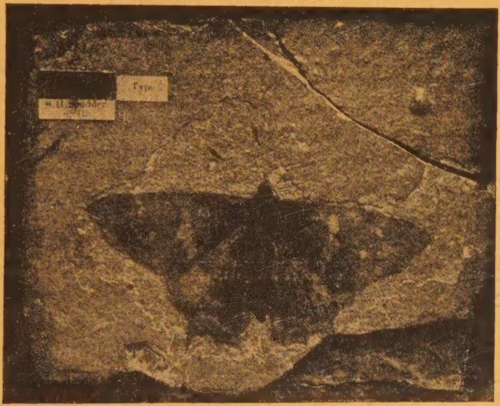

Prodryas persephone Scudder.

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VOL. XXV APRIL, 1918 No. 2

KEY AND DESCRIPTIONS FOR THE SEPARATION AND DETERMINATION OF THE FIRST INSTAR STEM MOTHERS OF THE THREE SPECIES OF APHIDS MOST COMMONLY ATTACKING THE CULTIVATED APPLE.

By M. T. Smulyan,

U. S. Bureau of Entomology, Melrose Highlands, Mass.

The following key and detailed descriptions were prepared in the spring of 1916, in Blacksburg, Va., while the writer was connected with the Virginia State Crop Pest Commission, and were to form part of a more extended paper, but as the publication of the latter has been delayed, these are submitted separately in the hope that they will prove of aid to those not yet familiar with the young stem mothers of the above three species of aphids.

Key.[1]

Cornicles long (about $\frac{1}{6}$ to $\frac{1}{10}$ of length of insect). Fig. 1, B.
  (Base of distal segment of antennæ distinctly shorter than the flagellum or unguis or distinctly less than one-half the total length of the segment.) Fig. 1, A. . . . . 1. *Aphis malifoliæ* Fitch (*Aphis sorbi* Kalt. of recent American authors).

Cornicles short or very short (longest about of the length of an abdominal segment). Figs. 2 and 3, B.
  Base of distal segment of antennæ as long or nearly as long as the unguis or equal or nearly equal to one-half the total length of the segment; cornicles about as long as an abdominal segment. Fig. 2, A and B. . . . . 2. *Aphis pomi* DeG.
  Base of distal segment of antennæ distinctly shorter than the unguis or less than one-half the total length of the segment; cornicles tuberculiform. Fig. 3, A and B. . . . . 3. *Aphis prunifoliæ* Fitch (*Aphis avenæ* Fab. of recent American authors).

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[1] The characters utilized here, as well as most of those embodied in the descriptions, can be made out by means of an hand lens or binocular microscope. The figures were drawn from balsam mounts.

DESCRIPTIONS.

1. A. **malifoliæ** Fitch (Rosy Apple Aphis).

Light to dark green, anterior portion of thorax (first two segments as a rule) usually lighter (light green may have a yellowish tint); anterior and dorsal aspects of head, antennæ, base and nearly ½ distal portion of rostrum, legs, apices of cornicles, and as a rule two transverse bands or lines at anal end of dorsum, dusky to black; the remainder of cornicles often dusky or brownish; eyes dull black (in balsam-mounted specimens deep red); as a rule a pale median longitudinal line on dorsum of head; often a small dusky median spot on the first thoracic segment (in good light seen to be interrupted medianly and longitudinally) and one on each side of the thoracic segments; caudal end of abdomen ventrally dusky sometimes; dorsum of head and thorax and the whole of the ventral surface of the insect more or less pulverulent. Newly-hatched specimens are light green as a rule, with head, thorax, and posterior portion of abdomen at sides, occasionally, pale yellowish-green; appendages similar to head and thorax, although the antennæ and legs are more often almost colorless; eyes deep red.

Antennæ comparatively long and varying in extent from end of thorax nearly to bases of cornicles, unguis about twice as long as base of distal segment, segments as follows: III .1155–.1386 mm., IV (base) .0539–.0616 mm., IV (unguis) .1001–.1309 mm., III with a distal sensorium and base of IV with a distal group composed of one large one and several smaller ones, III and IV imbricated but III not as strongly, III sometimes showing faint line of differentiation of future segments III and IV, the whole with a few short spinelike hairs; cornicles long .0770–.0847 mm., broad, cylindrical or subcylindrical (in some balsam-mounted specimens distinctly tapering), flanged at apices, often in part weakly imbri-

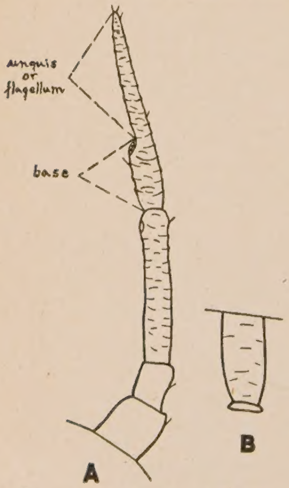

Fig. 1.—Antenna and cornicle of *Aphis malifoliæ* Fitch, about ×150.

cated, and varying in extent from beyond end of body to somewhat short of end of same; rostrum varying in extent from nearly to end of body to about metacoxa (relative length varying, like that of antennæ and cornicles, with the state of advancement of the insect—relatively shorter with feeding and consequent enlargement of body); legs armed with spinelike hairs, anterior tibiæ .1540–.1848 mm., intermediate tibiæ .1617–.1925 mm., metatibiæ .2002–.2464 mm.; anterior tangent of head usually faintly trilobed; eyes somewhat large; usually a pair of minute tubercles on each of last two segments (within transverse dusky lines or bands), and very often apparently a median double row of very minute tubercles or dots on remainder of dorsum, a pair on each segment; length of body .4620–.8316 mm., width at widest part .2464–.4312 mm.

2. A. pomi DeG. (Green Apple Aphis).

Dark green (well fed individuals may be lighter), anterior and dorsal aspects of head dusky to blackish with a pale or uncolored median longitudinal, often quite wide, band or stripe (when latter condition obtains the dark or dusky portion appears as two elongate spots); antennæ, base of rostrum, and legs dusky, tips of femora, distal portions of tibiæ, and tarsi quite often blackish; more or less of cornicles, and about $\frac{1}{3}$ distal portion of rostrum black or blackish; eyes black (in mounted specimens deep red); caudal end of abdomen ventrally sometimes faintly dusky; whole insect often slightly pruinose. Newly-hatched specimens are bright dark green, with head and more or less of anterior portion of thorax as a rule lighter and usually with a yellowish tint; antennæ, rostrum, and legs with a cast of the color of the body, tips of femora and of tarsi and distal portions of some of the antennal segments very often darker green; femora usually distinctly yellow-green.

Antennæ reaching from end of second segment to end of thorax, base and unguis of last segment equal or subequal (the inequality is slight when the specimen is not too highly

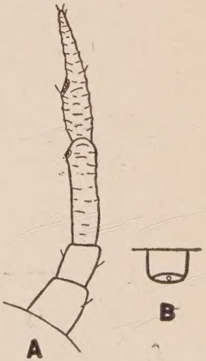

Fig. 2. — Antenna and cornicle of *Aphis pomi* DeG., about ×150.

magnified), segments as follows: III .0924–.1001 mm., IV (base) .0462–.0539 mm., IV (unguis) .0539–.0616 mm., III with a distal sensorium and base of IV with a distal group composed of one large one and several smaller ones, III as a rule imbricated but not as strongly as IV, the whole with a few short spinelike hairs; cornicles short, .0231 mm., broad, cylindrical or very nearly so, and rounded at distal end; rostrum reaching to or extending somewhat beyond metacoxa (varying in extent, like antennæ, with feeding, as in *malifoliæ*); legs armed with spinelike hairs, anterior tibiæ .1463–.1771 mm., intermediate tibiæ .1617–.2079, metatibiæ .1925–.2387 mm.; prothoracic and first and last pairs of abdominal lateral tubercles comparatively prominent and the last abdominal pair usually quite conspicuous—(all lose in conspicuousness as the insect body enlarges, but under higher magnification the last abdominal pair is quite easily made out in live specimens which have not fed too far, and is a very good distinguishing character); length of body .5236–.8162 mm., width at widest part .2772–.4004 mm.

3. **A. prunifoliæ** Fitch (Apple-Grain Aphis).

Dull light green or dull dark green, anterior and dorsal aspects of head dusky to blackish and very often with a pale or uncolored median longitudinal line; antennæ, base of rostrum, caudal end of abdomen ventrally, and legs dusky—distal portions of femora, tibiæ, and of tarsi may be still darker; cornicles and about $\frac{1}{3}$ distal portion of rostrum black or blackish; eyes black (in mounted specimens deep red). Newly-hatched specimens are light green, with head and thorax (at least first two segments) still lighter or pale yellow-green; appendages with a cast of the color of the body, although practically colorless in part sometimes; femora usually yellow-green.

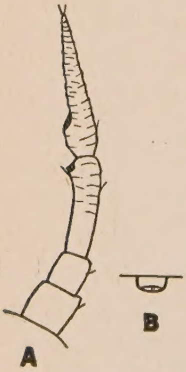

Fig. 3.—Antenna and cornicle of *Aphis prunifoliæ* Fitch, about ×150.

Antennæ stoutish, reaching to about end of thorax and "shortening up" somewhat with feeding, flagellum or unguis about twice as long as base, segments as follows: III .0924–.1001 mm., IV (base) .0385–.0462 mm., IV (unguis) .0847–.1001 mm., III with a distal sensorium and base of IV with a distal group composed of one large one and several smaller ones, IV imbricated and III as a rule in part faintly, the whole with a few spinelike hairs; cornicles very short, tuberculiform; rostrum reaching from somewhat beyond metacoxa nearly to end of body (relative length, like that of antennæ, varying as in the other two species); legs stoutish and armed with spinelike hairs, anterior tibiæ .1540–.1925 mm., intermediate tibiæ .1694–.2079 mm., metatibiæ .2156–.2387 mm.; length of body .4620–.8470 mm., width across widest part .2618–.4004 mm.

A. prunifoliæ is the first of the three to begin hatching, and in Virginia it may begin as early as the middle of March. The other two follow in about ten days to two weeks.

MYRIAPODS FROM NASHVILLE, TENNESSEE.

By Ralph V. Chamberlin,
Museum of Comparative Zoölogy, Cambridge, Mass.

The myriapods listed below are represented in a collection made by Mr. Harold Cummins of Vanderbilt University in and near Nashville and by him kindly sent to me for study. The collection is interesting particularly because it includes numerous well preserved specimens of a new diplopod genus of the family Nannolenidæ. Three other forms represent new species, two of Fontaria and one of Parajulus. There is a total of twenty-five species.

Chilopoda.

1. *Geophilus mordax* Meinert.

Two specimens taken in the Glendale Hills south of Nashville, one on Oct. 14, 1916, and one in March, 1917.

2. *Arenophilus bipuncticeps* (Wood).

One specimen labeled as found on "Nolensville Pike, Nashville, Feb. 25, 1917," and another labeled "Nashville, Nov., 1917."

3. *Gnathomerium umbraticum* (McNeill).

One specimen taken in the Glendale Hills in April, 1917.

4. *Theatops posticus* (Say).

Glendale Hills. One specimen taken May, 1917, and one March 25, 1917.

5. *Otocryptops sexspinosus* (Say).

Seven specimens of this abundant and widespread species. Four from Glendale Hills taken March 25, April 21 and in May, 1917; and three specimens taken beyond Glendale Oct. 14, 1916.

6. *Hemiscolopendra punctiventris* (Newport).

One specimen, Glendale Hills, April 21, 1917.

7. *Sozibius providens* (Bollman).

Glendale Hills, April 21, 1917. One specimen.

8. *Lithobius mordax* Koch.

Several specimens. One pair were taken "around pond between Gallatin and Nolensville Pike," March 14, 1917. A second pair at Belle Meade, Jan. 28, 1917.

9. *Lithobius transmarinus* Koch.

Several specimens of this form taken south of Nashville, Oct., 1916.

10. *Bothropolys multidentatus* (Newport).

Glendale Hills, April 21, 1917. One male.

11. *Scutigera forceps* (Rafinesque).

Nashville, May 6, 1917. One adult specimen taken "under a flat stone on a rather barren hillside."

DIPLOPODA.

12. *Platydesmus lecontei* (Wood).

Beyond Glendale, Oct. 14, 1916. Two specimens.

13. *Callipus lactarius* (Say).

Numerous specimens. Beyond Glendale, Oct. 14, 1916; south of Nashville, Nov., 1916; Nashville, March 25, 1917; and Glendale Hills, April, 1917.

14. *Cleidogona cæsioannulata* (Wood).

Beyond Glendale, Oct. 14, 1916. One specimen.

15. *Cambala annulata* (Say).

Nashville, March 25, 1917. One specimen.

Choctella gen. nov.

A Nannolenid genus which has the usual form and proportions of Spirobolus.

Mandibular combs 7.

Gnathochilarium as in Nannolene and Epinannolene.

Ocelli in several series, arranged in a triangular patch.

Repugnatorial pores beginning on the sixth somite, each pore in front of the transverse suture of the somite.

Antennæ short, composed of 7 articles of which the fifth and sixth are clavately enlarged.

Second and third articles longest, subequal; fourth, fifth and sixth but little shorter, subequal. Head below eyes deeply subvertically grooved, for the reception of the proximal portion of antennæ.

Dorsal plate of first somite large, extending forwards on a portion of head and largely concealing the antennæ.

First and second legs in male reduced in size but armed and otherwise similar to the succeeding pairs.

All somites excepting the first and last strongly longitudinally striate beneath and almost half way up to the repugnatorial pore, elsewhere smooth.

Posterior border of last segment above rounded, exceeded by the anal valves. Mesal edges of anal valves meeting in a distinct groove.

Gonopods well exposed. Gonopods two pairs, coleopods and phallopods respectively, the seminal duct traversing the latter.

Each coleopod simple, thin, plate-like, and undivided.

Phallopods also undivided.

Genotype: *Choctella cumminsi* sp. nov.

16. **Choctella cumminsi** sp. nov.

The general color below is black excepting the caudal, overlapping border of each somite. Dorsally the somites remain dark in a more or less narrow band adjacent to this pale posterior border elsewhere bearing greyish yellow or more typically in part reddish, the color rather irregular in arrangement. Ordinarily the light markings of the dorsum are less extensive anteriorly than elsewhere, the caudal segments also in some being similarly darker than the middle ones. Head in general greyish black. Labrum and adjacent region of head and narrow borders of first somite also reddish. Antennæ blackish. Legs dusky reddish brown. Anal valves reddish brown along their contiguous mesal margins.

Body Spirobolus-like in general form and appearance. Of uniform diameter throughout excepting the first few and last few somites. Surface in general appearing smooth and shiny but each somite excepting the first and last marked below on each side with a series of strong longitudinal striæ which do not extend up on the sides, the striation extending farther dorsad caudad of the suture than in front of it.

First repugnatorial pore on the sixth somite. Pores large, each in front of and well removed from the transverse suture.

Head with a pronounced vertigial sulcus connected from its anterior end to each eye by means of a finer transverse sulcus. Below this the surface is roughened by singular sulci which are more prominent laterally, but the smooth antennæ short, clavate, with the first two articles normally lying in a deep groove in front of and below the eye; first four articles sparsely hairy, the remaining ones densely clothed; sensory cones pale, distinct.

Eyes black, triangular, transversally-elongate; ocelli in 5 or 6 series; 30 to 40 in number. Setigerous foveolæ 3 + 3.

Plate of first somite large, extending over head to the transverse suture betweens eye and normally covering greater part of antennæ. Anterior margin curving broadly moderately forward on the sides, the lower anterior corner evenly rounded, the caudal corner projecting somewhat caudad and more narrowly rounded. The lower anterior and the ventral border elevated and set off by a suture, which does not extend across mid-dorsal region. No other distinct sulci.

Last somite a complete annulus much larger above than below with the caudal dorsal margin evenly rounded and surpassed by the anal valves. Anal valves ventrally smooth.

Seventh somite in male moderately produced below. Genopods well exposed. Coleopods simple, thin plates, each of which is moderately narrowed distad and narrowly rounded at the apex; below apical portion the mesal border of each is bent subcaudad. Phallopods exceeded by the caleopods. Each with distal division narrowly subconical, distally curving mesad, the tip somewhat obliquely truncate.

Number of somites 44 to 48.

Average length near 50 mm. with diameter 4.8 mm.

Localities. Glendale Hills, south of Nashville. Nine specimens April 21, 1917 and three specimens March 25, 1917.

17. *Parajulus pennsylvanicus* (Wood).

Beyond Glendale, Oct. 14, 1916. One female apparently this species.

18. **Parajulus nigrans** sp. nov.

The color is very dark, blackish throughout without definite paler spots or annuli. Feet also dark.

Body rather slender, obviously narrowing caudad. In general smooth, not pilose, but a few stiff, somewhat curved setæ on last segment and anal valves. Somites strongly longitudinally striate beneath and across lower part of sides.

First segment long, with the lower margin straight; margined below and over lower part anteriorly but not at all striate.

The anal plate above is acute but is not at all produced; it is clearly exceeded by the anal valves and bears a series of setæ along its caudal margin. Anal valves mesally margined.

Head with a median vertigial sulcus ending at a deeply impressed arcuate transverse sulcus extending between the eyes. Nearly smooth. Eyes triangular, each composed of about 36 ocelli arranged in 8 transverse series.

Repugnatorial pore moderate, contiguous or nearly so with the suture which is straight or rarely very slightly curved opposite the pore.

In the male the mandibular stipes strongly produced at the antero-inferior angle, the apex of the process being on nearly the same level as the inferior margin of the labrum.

Each first gonopod of the male is placed antero-lateral of the corresponding second one. Its anterior division is a flat plate about half as high as the posterior division against which it lies; its distal end is rounded. The second or posterior gonopods rise clearly above the anterior plates. Each above its base is a thin, flat blade with edge subapical, which near its middle curves caudad and then somewhat dorsad. Not at all narrowing dorsad, its free distal end truncate; from the basal portion a slender acutely pointed blade curves mesad and crosses the one from the other side.

Number of somites 51.

Length near 30 mm. Width at anterior end 2 mm.

Locality. Near Nashville. "Under stones in juniper patch near Nolensville Pike." Feb. 19, 1917. One male.

19. *Spirobolus marginatus* (Say).

One specimen taken in the Glendale Hills, April 21, 1917.

20. *Polydesmus canadensis* Newport.

A number of specimens of both sexes. Belle Meade, Jan. 28, 1917. Nashville, Feb. 25, 1917, and April 26, 1917 "under stones in a damp spring house." Glendale Hills, April, 1917.

21. *Polydesmus moniliaris* Koch.

Three specimens from the Glendale Hills, April, 1917.

22. *Euryurus erythropygus* (Brandt).

Eight specimens, four from "beyond Glendale," Oct. 14, 1916, and four from Glendale Hills, April, 1917.

23. *Fontaria tennesseensis* Bollman.

Glendale Hills, April 21, 1917. Two adult and two immature specimens.

24. **Fontaria glendalea** sp. nov.

Dorsum and head shining brownish black with the lateral carinæ alone yellow in the preserved specimen. Antennæ dark reddish brown. Legs yellow.

Body distinctly narrowing forward in male over the first four somites. Lateral carinæ large, in middle region posterior margin straight, transverse or nearly so, the ectocaudal angles in posterior plates moderately extended caudad. Surface to naked eye appearing smooth, under lens seen to be finely corrugated.

Repugnatorial pore on dorsal side of carina from the ectal edge of which it is well removed.

Vertigial sulcus of head deep. Head smooth. Occipital foveolæ 2+2, the clypeal 1+1.

In the male the caxæ of legs without processes. The sternites also without processes excepting a pair of contiguous subconical ones on the fourth somite, these being flattened anteroposteriorly. Genital processes of second somite short, cylindrical, distally truncate.

Basal lobe of each gonopod strongly setose on mesal side. Exterior division with setæ on posterior edge over basal and middle region; the branchis constricted above here into a slender blade of uniform width until the next to the distal fifth of length over which it is expanded to nearly double the width and then again narrows to a tongue which at its distal end is attenuated into a slender, distally bristle-like tip. About the distal three-fifths, or less, of the exterior blade is strongly bent upon itself roughly into a U-shape, with the slender tip at right angles to the arm bearing it. The basal spine short, slight, curved, acute.

Length about 39 mm. Width 10 mm.

Locality. Glendale Hills, south of Nashville, April 21, 1917.

Two adult males, one adult female and four immature individuals. Closely related to *F. rileyi* Bollman, described from Macon, Georgia.

25. **Fontaria mimetica** sp. nov.

General color at present dusky brown with the carinæ and borders of somites yellow. Of reddish caste and probably red in life. The posterior band of color usually widest at middle. The first somite with anterior as well as posterior border of the lighter color. Head light at sides and below level of antennæ. Antennæ deep reddish brown or chestnut. Legs yellowish.

Body conspicuously narrowed cephalad over the first four somites. Carinæ very much as in glendalea but with the caudal angles in general more produced.

Repugnatorial pore dorsal in position, widely removed from lateral edge.

Vertigial sulcus distinct. Occipital foveolæ 2+2; antennal and clypeal 1+1.

Sternite of third somite in male with two processes fused into a single conspicuous median body which is somewhat constricted at base. Fourth sternite with two separate subconical processes. Coxæ without spiral process aside from those giving exit to the genital ducts on the second pair.

Fifth sternite with two low, rounded eminences.

The general form of the gonopods as in glendalea, strongly coiled nearly into a complete circle open below, but the exterior division much broader, at first cylindrical, then flattened and near end of middle third of length narrowing to a much narrower blade which distad expands a little, somewhat clavately, the end being rounded, with no acute or spine-like process. Basal spine short and stout, at tip subconically narrowed, the apex narrowly rounded.

Length near 42 mm. Width 10 mm.

Locality. Glendale Hills, south of Nashville. April 21, 1917. One male.

Hillsboro Hills, Nashville, April 22, 1917. One female apparently of this species.

Also "Beyond Glendale," Oct. 14, 1916. One male and an immature specimen. The male is not in full color, the brighter carinal and marginal markings being scarcely evident. The general color is dusky over a dull yellow background. A dark median longitudinal dorsal line shows posteriorly. It appears to be a recently moulted individual.

NOTES ON DIPTERA.[1]

By J. M. Aldrich.

(a) In studying the habits of the "salt-fly" of Great Salt Lake (*Ephydra gracilis* Pack.) in 1911, I noted that trains crossing the lake on the famous Southern Pacific cutoff west of Ogden raise a constant swarm of these flies for an hour, and many of the insects get into passenger trains in spite of efforts to keep them out by closing the windows. My report says (Jour. N. Y. Ent. Soc., xx, 84, 1912), "They become a nuisance . . . in the dining cars. I had no difficulty in finding some of the flies in the latter situation as far west as Reno, Nev., and I doubt not that they may be found after the cars reach Oakland."

I can now add that the species has established itself in San Francisco Bay. On July 10, 1917, in sweeping about several little saline pools close to the shore of the Bay next to Palo Alto, I captured 18 specimens, indicating that it is a common species 30 miles south of the Oakland mole. I had no opportunity to examine other portions of the Bay shore.

Prior to the running of trains across Great Salt Lake, which began in 1904, there was no such opportunity for the flies to be carried, as the trains did not run close enough to the water.

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[1] Published by permission of the Chief of the U. S. Bureau of Entomology.

That the species is not indigenous to San Francisco Bay is fairly well demonstrated by the following facts: (1) It was not in the Stanford University collection, which is rich in local Diptera, the accumulations of many years, and is only about 2½ miles from the place where I recently found the species; (2) It is not in the collection of the University of California, although a few years ago an advanced student, Burle R. Jones, made and published a special study of California Ephydridæ, for which he collected extensively about the Bay (Catalogue of the Ephydridæ, etc. Technical Bull., Cal. Agr. Exp. Station, 1908); (3) It is not in the collection of the California Academy of Sciences, nor was it in the old collection destroyed by fire in 1906, as I personally know from examination; (4) In 1905–6 I collected repeatedly along the Bay near Palo Alto, and visited the same place again once in 1911, without finding the species.

As a matter of fact, up to the present report there have been only about half a dozen specimens of the species ever found away from Great Salt Lake; these are from Yuma and Salton Sea in the National Museum, one from Laguna, Cal., taken by C. F. Baker, and one from "S. Cal." which Jones made the type of *Ephydra cinerea*. The last two, which I have studied, are larger than the average but not larger than the largest specimens from Great Salt Lake, and the same is true of the 18 specimens I secured near Palo Alto last summer. This perhaps indicates that the extreme density of the water in Great Salt Lake exercises a dwarfing influence upon the species.

(b) When Van der Wulp described *Charadrella macrosoma* new genus and species, from Northern Yucatan (Biologia Cent.-Amer., Dipt., ii, 341, 1896), he added the following note:

"As the fourth vein is not curved, but runs directly to the tip of the wing, this genus is included here among the Anthomyinæ; on account, however, of the presence of a perpendicular row of macrochaetæ on the hypopleuræ, before the halteres, it would not belong to the Anthomyinæ in the sense of Girschner's system of the Muscidæ Calypteræ."

An Anthomyid with hypopleural bristles would be anomalous indeed, and I have long desired to see the species. The desire was gratified last January, when I found it correctly identified in Professor Hine's collection from Guatemala and British Guiana. The specimens agree with Van der Wulp's description throughout, except for one thing:—there is not the slightest trace of the row of hypopleural bristles. The genus has so many strong characters that misidentification seems impossible; the only other explanation of the discrepancy is that Van der Wulp saw the bristles on some other fly and got it confused with this species, and this I think is what happened.

Since Charadrella has a number of unusual features, and does not fit well in any of the subfamilies recognized by Malloch in his recent tabulation (Canad. Ent., Dec., 1917, 406), I add the following mostly chaetotactic characters taken from one of Professor Hine's males:

Head: front one-fourth the head-width at vertex, widening forward very gradually; frontals in a single row, about 10, the lowest just at the antennal insertion; ocellars broadly diverging, slightly proclinate; no cruciate bristles; verticals as usual but not strong; vibrissæ large, just at the lower edge of head, above them a patch of small black hairs extending more than halfway to root of antennæ and nearly halfway to the eye; infra-orbital cilia (setæ) pale.

Thorax: ps dc 3 (from the spacing 4 will probably also occur), ant dc 2, hum 4, posthum 1, prs 1, npl 2, intal 2, supal 3 (of which the prealar is less than half as long as the next), postal 2, ant acr 0, post acr 1 (prsc), stpl 3 (the anterior small, posterior 2 close together vertically), mesopleura with 3 at lower front corner and a row of 6 behind, sternopleura and mesopleura with upright rather long pale hairs which also cover the pteropleura, hypopleura bare; scutellum with two long pairs, marginal and apical, and several small submarginal, the disk very hairy; both spiracles very large; hind calypter much exceeding front one; scutellum bare below.

Abdomen: first and second segments without bristles above, third with 4 marginals, fourth with 6 marginals and a discal pair so far apart that they stand almost at the edge; sternites 2–5 with a few bristles; 2–4 separated from the tergites by a wide membrane; genitalia small.

Wing: third and fourth veins strongly divergent toward tip, the third sinuous, ending a little before apex, fourth very slightly turned forward near tip, less than third; no setæ on any veins, no costal spine; sixth vein does not reach margin, seventh parallel with it.

Legs: tibiæ almost without bristles, hind basitarsus not with spine below.

(c) In the Carnegie Museum are three flies which were probably captured farther north than any others on record. They were taken by J. W. Goodsell, surgeon of the Peary Expedition, and are labeled, "82 degrees north latitude, on the beach at the northeastern extremity of L. Hazen, in the interior of Grant Land. June 7, 1908." This would be about 550 miles from the pole. One of the specimens is *Fucellia pictipennis* Beck., a species described from Greenland and taken since in the Arctic by the Canadian Arctic Expedition. The other two specimens belong to *Phormia terræ-novæ* Desv., described from Newfoundland and again from Greenland, a circumpolar species which is common in the mountains of the western states and occurs rarely in lower altitudes (Indiana, New Jersey).

(d) Two or three years ago Professor Johannsen inquired of me if I had any males of Lonchoptera. On going over my material, I was surprised to find but two males;—one from Colorado, taken by C. F. Baker, the other from the Parry Sound region of Ontario, taken by H. A. Parish. My attention being thus directed to the rarity of males, I followed up the matter during my sweeping work in the summer of 1916, noting in each sweeping the number and sex of the Lonchopteras. At the end of the season I had counted 2,652 specimens, all females, not a single male appearing. Most of these were taken in northern Indiana, but many were from other parts of the United States, and a few from Ontario.

In this connection should be mentioned Mr. Lundbeck's treatise on Lonchoptera in his beautiful series called Diptera Danica, v, 1–18, 1916. He recognizes in Denmark three species,—*tristis*, *lutea* and *furcata*. He says nothing about any rarity of males in the first two, but in *furcata* he says he has not seen the male, and only about six are known in collections, while the female is common. This is a parallel case, if in fact we do not have the same species, as I believe we do.

(e) The common leaf-miner *Agromyza pusilla* has many host-plants; I have reared it from mines in leaves of the common milkweed, *Asclepias syriaca*, and have found apparently the same maggot in leaves of horsemint, *Monarda punctata*. These two plants seem rather unfavorable for the purpose, on account in the one case of the abundant milk, and in the other the fiery taste. Yet on closer investigation neither of these qualities hinders the miner. In the case of milkweed, the miner feeds in the palisade tissue and does not touch the laticiferous system lying lower down in the leaf. If it should by accident cut into these vessels, it would no doubt be drowned in the outflow of milk, but apparently this does not happen. It enters and departs by the upper surface.

In the case of Monarda the explanation is not so easy to get at. The hot taste comes from the essential oil, of course, and it seemed that this must occur in some tissues not attacked by the maggot; but I asked several botanists in vain as to the location of the oil deposits. At length Dr. W. N. Steil, of the botanical department of the University of Wisconsin, told me that the identical point had been investigated in that department; he looked it up and kindly wrote me that the oil was found to occur only in the trichomes in Monarda. These being entirely superficial organs, of course the maggot does not eat them.

No special instinct would seem to be necessary in either of these cases.

(f) In Melander and Spuler's paper on Sepsidæ (Bull. 143, Wash. Agr. Exp. Station) they mention on page 44 my capture of *Themira putris* L. attending plant-lice on cottonwood, and the same record occurs in my Catalogue of Diptera, page 619. As a slight contribution to the history of the spread of the species I will add that this occurred four miles north of Brookings, S. D., on Aug. 9, 1891, ten years before the first record of the occurrence of the species in North America, which record was by G. Chagnon, in The Entomological Student, ii, 13, 1901; his locality was Montreal. My specimens attending plant-lice were on a tree a few feet from a privy, and this was probably the source of the flies. I still recall my exultation when I succeeded in tracing the species in Schiner's Fauna Austriaca, and found it new to North America.

(g) *Chrysomyza demandata* Fabr. was first reported from North America by C. W. Johnson in Ent. News, xi, 609, 1900; localities were Philadelphia and Riverton, N. J. The year of capture is given by Knab as 1897 in Science for January 14, 1916,—presumably he took it from specimens sent by Johnson to Coquillett for determination. The earliest date on specimens in the collections of the Illinois State Laboratory of Natural History is August, 1908, and Tucker reported it from Kansas in the same year (Kans. Acad. Sci., xxii, 278, 1908), but probably collected it earlier. In the Pacific Northwest, I collected a specimen at Pendleton, Ore., on May 19, 1907; Mr. Wm. M. Mann secured two at Wawawai, Wash., on Aug. 30, 1908; and it was common on carrot flowers at Moscow, Idaho, on Sept. 4, 1908. It was in Arizona in 1910 (C. N. Ainslie, Proc. Ent. Soc. Wash., xiii, 118). These items may be of service in tracing the spread of the species.

(h) I am indebted to W. H. Dall, of the National Museum, for further information about the Psilopus of Poli, 1795, which was long supposed to preoccupy the same name as applied to a genus in the Dolichopodidæ. Poli's large work, "Testacea utriusque Siciliæ," is unique as a taxonomic effort, in that the writer used a complete double set of names,—a genus and species for each kind of shell, and an entirely different genus and species for the soft parts of the same mollusc. Thus the system is tetranomial rather than binomial, and Dr. Dall informs me that it is considered by taxonomists in Mollusca to be entirely outside of nomenclature; he added in reply to my question that he was not aware of any controversy whatever on the point. This is the same point of view expressed by Sherborn in Index Animalium, noted by me in Canadian Entomologist, 1910, 100. Since it seems that Poli's work is the same nomenclaturally as if it had never been written, there can be no objection to the use of Psilopus by Meigen in 1824.

In this connection it may be well to add that the distinctions upon which I based Gnamptopsilopus 1893, and recognized Agonosoma as distinct from Psilopodinus in my Catalogue of 1905, break down entirely in the oriental region; so I would not include all in Psilopus.

BOOK REVIEWS.

FIELD BOOK OF INSECTS. Lutz, F. E. 509 pp., pocket octavo, 101 plates of numerous figures. G. P. Putnam's Sons, New York, 1918. $2.50.

This book is an innovation among insect books in several ways. It is printed on thin paper with narrow margins and on this account contains more material than would appear from its exterior; it includes keys to the families of some orders, to the genera of some families and to the species of a few groups of conspicuous insects like the longicorn beetles, household flies, bumble-bees, etc.; and lastly it is written by one who has had unusual opportunities to find out what the "layman" really wants to know about insects. From the latter it must not be inferred that the entomologist will not find the book useful, especially to put in the hands of beginning students. The illustrations, many of which are colored, are very good and well selected, the great majority original, from drawings by Mrs. Beutenmuller. Unfortunately the publishers have failed entirely to number the colored plates but as all the figures have the names appearing beneath them this omission is not so bad as it might have been. C. T. B.

A YEAR OF COSTA RICAN NATURAL HISTORY. Calvert, A. S. and P. P. Calvert. Octavo, pp. 577, with numerous half-tone illustrations and map. The Macmillan Co., New York, 1917.

Although this is a general account of Costa Rican natural history, its writers are particularly interested in dragon-flies, and the book is in quite considerable part entomological. Aside from a description of the country and its people as observed by the writers during their visit, there are notes on the fauna and flora illustrated by a series of good photographs and a large number of observations on insects other than Odonata. The writers were in Cartago at the time of the destructive earthquakes of May, 1910, but fortunately escaped injury and were able to save the collections they had made.

The book gives an idea of the entomological possibilities of Costa Rica and should be of interest to entomologists or others planning to visit this country as well as to those expecting to journey in other parts of the American tropics for the first time.

C. T. B.

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Notices not to exceed four lines in length concerning exchanges desired of specimens or entomological literature will be inserted free for subscribers, to be run as long as may be deemed advisable by the editors.

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Histeridæ. North American Histeridæ identified or unidentified, desired in exchange for beetles of other families. F. G. Carnochan, Bussey Institution, Forest Hills, Massachusetts.

Hemiptera-Heteroptera. I desire specimens of this group from all regions, especially New England. I will give in exchange species of this and other orders (except Lepidoptera), and will identify New England material. Correspondence desired.—H. M. Parshley, Smith College, Northampton, Mass.

Wanted: Psyche, Vol. IX, No. 300 (April, 1901). Address, giving price, Librarian, Stanford University, Cal.

Sarcophagidæ from all parts of the world bought or exchanged according to arrangement. North American material determined.—R. R. Parker, State Board of Entomology, Bozeman, Mont.

Wanted: Insects of any order from ant nests, with specimens of the host ants, from any part of the world; also Cremastochilinæ of the world. Will give cash or Coleoptera, Hymenoptera and Diptera from the United States.—Wm. M. Mann, Bussey Institution, Forest Hills, Boston, Mass.

Want to correspond with collectors of Noctiudæ in Northern Massachusetts. Subject to supply will pay any reasonable price for good specimens Catocola sappho.—Howard L. Clark, P. O. Box 1142, Providence, R. I.

Wanted: Old Series Entom., Bul. 1, 2, 3, 33; Technical Series 4, 6, 7; Insect Life, vol. 4–6; Jour. Applied Microscopy I, N. Y. State Entom. Rep. 3, 4; Fitch Rep. 7, 8, 13.—Philip Dowell, Port Richmond, N. Y.

Wanted: Insects of the family Embiidæ (Scoptera). I would give insects of any order except Lepidoptera. I would like to correspond with persons interested in this family.—Raoul M. May, 2202 W. 10th St., Los Angeles, California.

Wanted: To exchange, or purchase for cash, specimens of the Genus Apantesis from any locality. Also to purchase rare Catocalæ.—Samuel E. Cassino, Salem, Mass.

Wanted: 19th Illinois Entomological Report; Coleoptera of Southern California, by H. C. Fall; Notes on Lachnosterna of Temperate North America, by J. B. Smith; Complete Works of Thos. Say, Le Conte edition.—J. S. Wade, U. S. Bureau of Entomology, Washington, D. C.

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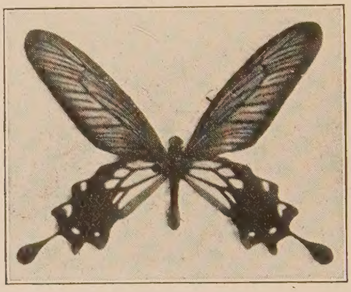

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